

Approved For Release 2000/08/17 : CIA-RDP61-00391R000100410214-8

*Office Memorandum* • UNITED STATES GOVERNMENT

TO : DAD-G

DATE: 14 July 1952

FROM : [REDACTED] 25X1A5a1

SUBJECT: Aid to Photo-Analysis of Surface Geology

While discussing with you my conferences with Reconnaissance Branch personnel on 10 July 1952, the point was suggested that heat (infra-red) photography with simultaneous normal photography might be of assistance in the interpretation of soils and rocks. This idea has been stirring in my mind ever since our conversation. I think the idea should be explored. Attached is a roughed out proposal that might be passed on to [REDACTED]

25X1A9a

Enclosure: (1)

FMB:mk

AN AID TO PHOTO ANALYSIS OF SURFACE GEOLOGY

ARGUMENT:

Heat photography registers the non-visible, long wave radiant energy emitted by bodies whereas normal photography registers the visible wave-lengths of radiant energy reflected or emitted by a body.

Different types of rocks will emit proportionally different amounts of radiant heat depending upon the composition of the rock - primarily the effect of basic versus acidic constituents. Different types of soils will emit proportionally different amounts of radiant heat depending upon the color of the soil and the amount of moisture in the soil. Dark soils will emit more than light-colored soils, dry soils more than wet soils.

If the theoretical statements are corrent, then simultaneous heat and visual-light photographs of an area will allow a far more detailed study and analysis of a region than can be made from simple light-photography. Therefore, the theory should be investigated for application to the study of surface geology of a region. From the visual light photography the surface structure can be deduced. From the radiant heat photography the relative radiation may differentiate rock and soil types. The amalgamation of these data should yield a significant amount of geologic information about the region under study.

PROPOSAL:

The outlined theory can be tested in the following manner:

- a. Select an area where there is a variety of soil types and another where there is a variety of rock types.
- b. Fly heat and light cameras over these areas simultaneously preferably with cameras that will give the same image scale.
- c. Draw a structural chart of the regions from the light-camera photographs and superimpose over this a positive transparency from the heat-negatives.
- d. Correlate the two photographs of the area with known ground surveys of the area.

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NOTE:

The flying might well be done from the AF Photographic School at Lowry Field. Areas of great rock diversity are near-by in the Black Hills of South Dakota and others may be found in Montana. Soil diversity is also great in the same general region. If the system works only for wet and dry soil it will be of great use to the Army when planning movements across muskeg, etc.